

# Trucks and Freeways

## Community Concerns

The Southeast Los Angeles (SELA) community is surrounded by the Interstate 105 to the south, Interstate 110 to the west, and Interstate 710 (I-710) to the east. The I-710 is a vital transportation corridor for goods movement out of the Ports of Los Angeles and Long Beach, the busiest container ports in the United States. A daily average of up to 240,000 vehicles transit along the portion of the Interstate 710 in the SELA community.<sup>1</sup> Heavy-duty trucks contribute to about 8.7% of the average daily traffic volume and over 90% of diesel particulate matter (DPM) emissions.<sup>2</sup> Based on South Coast AQMD's MATES IV study, in 2012 DPM emissions accounted for about 68% of the air toxics risk in the South Coast Air Basin. However, the California Air Resources Board (CARB) projects that between 2012 and 2030 there will be over a 95% reduction in on-road DPM emissions in the South Coast Air Basin from the implementation of mobile source regulations, with most of the reductions occurring before 2023.<sup>2</sup>



The SELA community has expressed concern about emissions from heavy-duty trucks traveling along the I-710 and idling near storage yards and fueling stations. Community residents are also concerned about the general traffic congestion in their neighborhoods and the potential of large warehouses or fulfillment centers opening in the future, which may also increase truck activity. To gain understanding of the vehicle population in the SELA community, a summary of vehicles registered by model year is available at <https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/southeast-los-angeles/vehicle-registration.pdf?sfvrsn=8>. It should be noted that many on-road vehicle categories, such as trucks, may not always operate where they are registered.

## Emissions from Trucks and Freeways

The largest sources of emissions from Trucks in SELA generally fall into two categories, including, medium heavy-duty trucks (14,001 - 33,000 lbs.) and heavy heavy-duty trucks (over 33,000 lbs.). Examples of medium heavy-duty trucks include commercial delivery trucks, beverage trucks, and school buses. Examples of heavy heavy-duty trucks are freight trucks used to move shipping containers, cement trucks, dump trucks, and city transit buses. See Figure 1 – General Trucks Categories.

<sup>1</sup> Caltrans, Caltrans Traffic Census Program. <https://dot.ca.gov/programs/traffic-operations/census>, Accessed February 13, 2020.

<sup>2</sup> California Air Resources Board, Community Air Protection Program 2019 Community Recommendations Staff Report. <https://ww2.arb.ca.gov/resources/documents/2019-community-recommendations-staff-report>, Accessed February 18, 2020.

Figure 1 – General Truck Categories

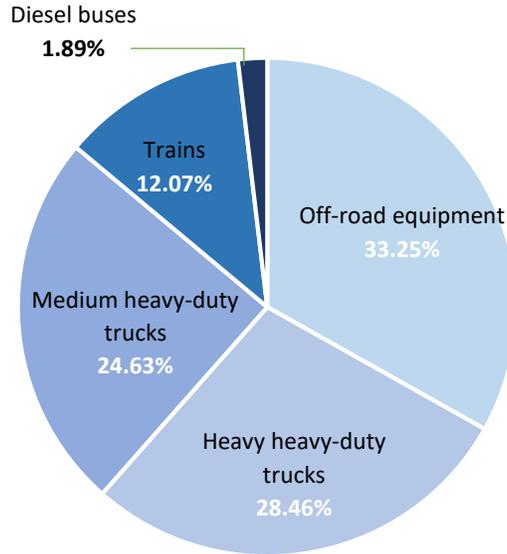
Category	Definition	Example
<p><b>Medium Heavy-Duty</b></p>	 <p>14,001-33,000 lbs.</p>	
<p><b>Heavy Heavy-Duty</b></p>	 <p>Over 33,000 lbs.</p>	

Based on emissions from the years 2016 and 2017, medium heavy-duty and heavy-heavy duty trucks contribute approximately 53% of all DPM in SELA.<sup>3</sup> Other large sources of DPM in SELA are locomotives (i.e., trains), off-road equipment (e.g., cargo handling equipment, construction equipment), and diesel buses. For the overall contribution of these sources by percentage, see Figure 2 – Sources of DPM in SELA. DPM is a toxic air pollutant that comes from diesel engines and is a top contributor to air toxics cancer risk. Additional information about DPM and health effects is available at <https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health>.

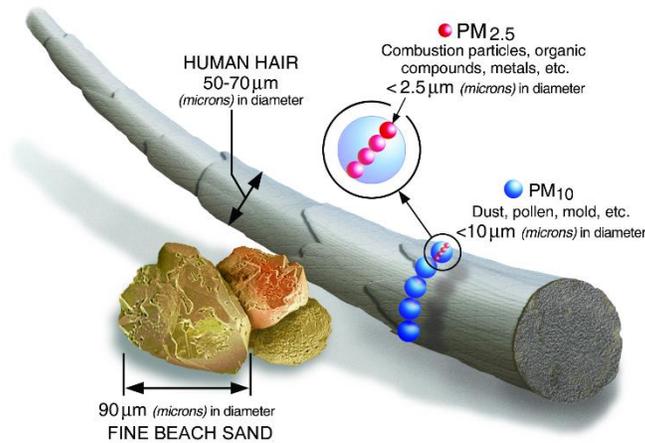
Trucks also contribute to fine particulate matter (PM<sub>2.5</sub>), particulate matter (PM<sub>10</sub>), volatile organic compounds (VOCs), and nitrogen oxides (NO<sub>x</sub>) emissions. PM<sub>10</sub> and PM<sub>2.5</sub> are particles smaller than 10 and 2.5 microns, respectively that can be inhaled deep into the lungs and cause health problems. Figure 3 – Particulate Size Comparison shows the relative sizes of PM<sub>10</sub> and PM<sub>2.5</sub>. Additional information about PM<sub>10</sub> and PM<sub>2.5</sub> are available at <https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health>. ROG is a group of gases that contribute to forming smog, such as acetone, benzene, and formaldehyde. NO<sub>x</sub> is a family of gases that are highly reactive with other pollutants to form both ozone (smog) and PM<sub>2.5</sub>. Ozone can harm the respiratory system. Additional information about ozone is available at <https://ww2.arb.ca.gov/resources/ozone-and-health>.

<sup>3</sup> South Coast Air Quality Management District, Sources of Air Pollution Southeast Los Angeles. <http://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/southeast-los-angeles/source-attribution-fact-sheet.pdf>. Accessed July 10, 2020.

**Figure 2 – Sources of DPM in SELA**



**Figure 3 – Particulate Matter Size Comparison (PM10 and PM2.5)<sup>4</sup>**



<sup>4</sup> U.S. EPA. Particulate Matter (PM) Basics. <https://www.epa.gov/pm-pollution/particulate-matter-pm-basics>. Accessed July 14, 2020.

Table 1 – Emissions from Mobile Sources in SELA below, provides an overview of on-road mobile source emissions in SELA. Emissions from medium heavy-duty and heavy-heavy duty trucks are in yellow highlights.

**Table 1 – Emissions from On-Road Mobile Sources in SELA in 2018 (Tons per Year)<sup>5, 6</sup>**

On-Road Mobile Sources – SELA	NOx	ROG	PM10	PM2.5	DPM
†Light and Medium-Duty Vehicles	447.75	492.00	134.76	57.58	0.37
†Light Heavy-Duty Vehicles	17.45	20.97	2.82	1.19	--
Medium Heavy-Duty Vehicles	208.68	17.02	12.09	7.99	5.25
Heavy-Heavy Duty Vehicles	493.37	25.79	12.84	8.34	5.93
Buses	17.24	2.32	1.25	0.73	0.38
Total On-road Mobile Sources	1,184.49	558.10	163.76	75.83	11.94

\*Passenger cars and pickup trucks

## Air Monitoring

The SELA community is intersected by a multitude of public roads and freeways with high traffic volumes and a high fraction of diesel trucks due to the presence of railyards, warehouses and the associated goods movement in the area. Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust is known as DPM, which is a component of PM2.5. There is no technique to directly measure DPM (a major contributor to health risk); therefore, indirect measurements based on surrogates for diesel exhaust are used, specifically black carbon (BC). DPM is typically composed of carbon particles (“soot”, also called BC) and numerous organic compounds. Diesel exhaust also contains gaseous pollutants, including volatile organic compounds (VOC) and NOx.

The monitoring strategy to study and characterize this air quality priority consists of comprehensive measurements conducted using a mobile platform capable of monitoring a wide range of particulate and gaseous pollutants, including BC, PM, ultrafine particles (UFP), and nitrogen dioxide (NO<sub>2</sub>). Mobile monitoring is first conducted in areas identified by the CSC, such as areas with heavy-duty trucks idling near storage yards and fueling stations, as well as roadways with traffic congestion in neighborhoods, prioritized based on available truck density information. These measurements will extend to other areas within the SELA community to support implementation of emission reduction strategies and help track their progress; identify air pollution hotspots; and help to assess the impact of truck emissions on community exposure.

## Regulatory Efforts and Enforcement

Under the Clean Air Act (CAA),<sup>7</sup> the U.S. EPA sets standards for air quality for certain ‘criteria’ air pollutants, including the maximum concentration of those pollutants in the air anywhere in the United States. The CAA allows EPA to establish emission limits on mobile sources, such as heavy-duty trucks, by regulating both the composition of fuels and tailpipe emissions and on-road and off-road engines. CARB is the primary authority

<sup>5</sup> South Coast Air Quality Management District, Sources of Air Pollution Southeast Los Angeles. <http://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/southeast-los-angeles/source-attribution-fact-sheet.pdf>. Accessed July 10, 2020.

<sup>6</sup> California Air Resources Board, Community Air Protection Program 2019 Community Recommendation Staff Report. [ww2.arb.ca.gov/resources/documents/2019-community-recommendations-staff-report](http://ww2.arb.ca.gov/resources/documents/2019-community-recommendations-staff-report). Accessed July 10, 2020.

<sup>7</sup> U.S. EPA, Summary of the Clean Air Act. <https://www.epa.gov/laws-regulations/summary-clean-air-act>. Accessed July 14, 2020.

over mobile sources in the state of California and can set in-state fuel and tailpipe standards for many of the same vehicles as the federal government, though it often requires a waiver from EPA. South Coast AQMD has primary authority over stationary sources with some limited mobile source authority. For example, South Coast AQMD can address “indirect sources” (facilities that attract mobile sources) through facility-based measures. The sections below describe the regulatory and enforcement efforts from the U.S. EPA, CARB, and South Coast AQMD.

### **US EPA and CARB**

Since the designation in California of diesel particulate matter as a toxic air contaminant in 1998, CARB has developed a suite of regulations (rules) and Airborne Toxic Control Measures to reduce Californians’ exposure to this cancer-causing pollutant, including emissions from heavy-duty (large) diesel trucks and buses. CARB has addressed truck and bus diesel emission reductions through existing regulations, such as the Drayage Truck Regulation,<sup>8,9</sup> and the Truck and Bus Regulation,<sup>10,11</sup> which require the use of exhaust after treatment, like diesel particulate filters; newer engines that meet lower air pollutant emissions standards; and limits on idling of diesel-fueled vehicles, such as trucks and buses. See Figure 4 - CARB Enforcement Programs Relevant to Trucks, for more details on these rules. Figure 4 – CARB Enforcement Programs Relevant to Trucks, provides an overview of CARB’s enforcement programs).

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<sup>8</sup> California Air Resources Board, Update on California Actions to Minimize Community Health Impacts from Freight, March 2019, [https://www.arb.ca.gov/board/books/2019/032119/19-3-2pres.pdf?\\_ga=2.79278740.1419761847.1559951314-1545453421.1552083450](https://www.arb.ca.gov/board/books/2019/032119/19-3-2pres.pdf?_ga=2.79278740.1419761847.1559951314-1545453421.1552083450), Accessed July 4, 2019.

<sup>9</sup> California Air Resources Board, Drayage Trucks at Seaports and Railyards, <https://ww2.arb.ca.gov/our-work/programs/drayage-trucks-seaports-and-railyards>, Accessed July 4, 2019.

<sup>10</sup> California Air Resources Board, Truck and Bus Regulation Compliance Requirement Overview, <https://www.arb.ca.gov/msprog/onrdiesel/documents/FSRegSum.pdf>, Accessed July 4, 2020.

<sup>11</sup> California Air Resources Board, Truck and Bus Regulation On-Road Heavy Duty Diesel Vehicles (In-Use) Regulation, <https://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>, Accessed July 4, 2020.

**Figure 4 – CARB Enforcement Programs Relevant to Trucks**

	<p>CARB conducts <b>idling</b> sweeps to ensure vehicle idling limits are not exceeded. See below for further details on this rule.</p>
	<p><b>Drayage vehicles</b> are heavy-duty vehicles (HDV) that move goods. HDV that enter the port or intermodal facility are required to have newer engines (2007+) that are certified to cleaner emissions standards.</p>
	<p><b>Transport Refrigeration Units (TRUs):</b> Inspect secondary engines to ensure TRUs meet labeling and clean air requirements.</p>
	<p>For the <b>Heavy-Duty Vehicle Inspection Program</b>, CARB regularly conduct inspections for:</p> <ul style="list-style-type: none"> <li>• Diesel Emission Fluid (DEF): a liquid used as a reductant in heavy duty diesel engines to reduce NOx emissions.</li> <li>• Emission Control Label (ECL): Engine certification labeling requirements.</li> <li>• Smoke/Tampering: Requires heavy duty trucks/buses to be inspected.</li> </ul>
	<p><b>Statewide Truck and Bus program</b> requires all vehicles with 2009 or older engines weighing over 14,000 pounds to reduce exhaust emissions by upgrading to 2010 or newer engines by 2023. Non-compliant vehicles will be denied DMV registrations.</p>

Both CARB and South Coast AQMD enforce the idling rules, including the Commercial Vehicle Idling Regulation prohibiting commercial vehicles (with a gross vehicle weight rating of greater than 10,000 pounds)<sup>12</sup> The regulation restricts idling to five minutes or less for commercial vehicles:

- Without a “Clean Idle Sticker” (2007 and newer model-year diesel engines that meet low NOx limit of 30 g/hr), or
- With a “Clean Idle sticker” and idling within 100 feet of schools, residences, hotels, or other restricted areas, or
- Operating diesel-fueled auxiliary power systems within 100 feet of restricted areas.

The regulation also provides exceptions for queuing (i.e., vehicles waiting in line to perform work where shutting engines off is not possible). Figure 5 – Clean Idle Sticker, shows a clean idle sticker provided for diesel engines that meet CARB’s certification requirements.

<sup>12</sup> California Air Resources Board, Complaints – Idling Vehicles, <https://ww2.arb.ca.gov/our-work/programs/environmental-complaints/complaints-idling-vehicles>, Accessed July 4, 2020.

Figure 5 – CARB Certified Clean Idle Sticker



In addition, to helping cities address idling, CARB has developed an “Options for Cities to Mitigate Heavy-Duty Vehicle Idling” guidance document, which includes options for cities to address heavy-duty vehicle idling emissions in their communities.<sup>13</sup>

CARB continues to work towards reducing emissions the residual public health risk from Transport Refrigeration Units (TRU)<sup>14</sup> near distribution centers and other facilities where TRU activity is focused, and reducing emissions while in transit, especially near the most impacted communities. Improving freight efficiency and transitioning to zero-emission technologies will reduce toxic air contaminant emissions, criteria pollutant emissions, and greenhouse gas emissions. Improving freight efficiency and transitioning to zero-emission technologies will reduce toxic air contaminant emissions, criteria pollutant emissions, and greenhouse gas emissions. CARB has created advisories and forms to assist TRU owners in understanding compliance requirements to ensure that regulated entities (e.g., TRU owners, TRU operators, facilities that support TRU use, etc.) are aware of their responsibilities under the TRU regulation.

CARB also recently adopted the Advanced Clean Trucks Rule requiring truck manufacturers to transition from producing diesel trucks and vans to electric zero-emission trucks including heavy-duty vehicles beginning in 2024. Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines would be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. This rule also requires that fleets report information on a one-time basis about their vehicles to support future zero-emission fleet rules.<sup>15</sup> CARB is also considering new requirements to further reduce emissions from trucks and TRUs. Table 2 below illustrates the key upcoming activities from U.S. EPA and CARB.

**Table 2 – Upcoming Rule Development/Activities from U.S. EPA and CARB**

<sup>13</sup> California Air Resources Board, Options for Cities to Mitigate HDV Idling, [https://ww2.arb.ca.gov/sites/default/files/2020-03/arb\\_options\\_cities\\_mitigate\\_idling.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-03/arb_options_cities_mitigate_idling.pdf), Accessed July 4, 2020.

<sup>14</sup> California Air Resources Board, Transport Refrigeration Units, <https://ww2.arb.ca.gov/our-work/programs/transport-refrigeration-unit>, Accessed July 4, 2020.

<sup>15</sup> California Air Resources Board, Advanced Clean Trucks, <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>, Accessed July 4, 2020

Agency	Proposed Action	Expected Decision	Expected Phase-in Period
U.S. EPA	Cleaner Truck Initiative <sup>16</sup> – In response to a petition from the South Coast AQMD, U.S. EPA has committed to updating its truck engine standard to reduce NOx emissions.	2021	2027-?
CARB	Transport Refrigeration Unit Regulation <sup>17</sup> – Measure to reduce emissions and residual risk from TRUs by transitioning to zero-emission technologies.	2021	TBD
CARB	Zero-Emission Fleet Rule <sup>18</sup> – Would require fleets to transition to zero-emissions, including drayage trucks.	2021	2024-?
CARB	Heavy-Duty Low NOx Rule <sup>19</sup> – Would set new statewide engine standards for trucks. 60-75% NOx reduction between 2024-2026. Additional reductions in 2027 and beyond.	2020	2024-?
CARB	Heavy-Duty Inspection and Maintenance - Similar to smog check for cars and light duty trucks, this would allow an on-board diagnostics system checks to identify malfunctioning emissions-related components in applicable engines.	2021	2023-?

### South Coast AQMD

South Coast AQMD staff is actively working on Proposed Rule 2305 Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program.<sup>20</sup> Staff released the first draft rule in May 2020. The purpose of the draft rule is to reduce local and regional NOx and DPM emissions and facilitate local and regional emission reductions associated with warehouses larger than 100,000 square feet and the mobile sources attracted to these warehouses. The Warehouse ISR is scheduled to be considered by the South Coast AQMD Governing Board in the first quarter of 2021.

In addition to rule development efforts, South Coast AQMD staff enforce CARB’s Commercial Vehicle Idling Regulation that prohibits commercial vehicles (gross vehicle weight rating greater than 10,000 pounds) from idling for more than five minutes. South Coast AQMD enforcement efforts include routine idling sweeps with follow-up enforcement action.

<sup>16</sup> U.S. EPA, Cleaner Trucks Initiative, <https://www.epa.gov/regulations-emissions-vehicles-and-engines/cleaner-trucks-initiative>, Accessed July 4, 2020.

<sup>17</sup> California Air Resources Board, New Transport Refrigeration Unit Regulation in Development, <https://ww2.arb.ca.gov/our-work/programs/transport-refrigeration-unit/new-transport-refrigeration-unit-regulation>, Accessed July 4, 2020

<sup>18</sup> California Air Resources Board, Zero-Emission Vehicle Fleet, <https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-fleet>, Accessed July 4, 2020.

<sup>19</sup> California Air Resources Board, Heavy-Duty Low NOx, <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>, Accessed, July 4, 2020.

<sup>20</sup> South Coast AQMD, Proposed Rule 2305 Warehouse Indirect Source Rule – Warehouse Actions and Investments to Reduce Emissions (WAIRE) Program. [https://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/warehouse-isr\\_prelim-1st-draft.pdf](https://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/warehouse-isr_prelim-1st-draft.pdf). Accessed July 14, 2020.

## Incentives

South Coast AQMD funds projects to develop zero-emission technologies, such as battery-electric and fuel cell, for heavy-duty trucks. South Coast AQMD also offers incentives to truck owners to replace older polluting trucks with cleaner trucks. Specifically, the truck owners must use these incentives to purchase trucks that are cleaner than what the regulations currently require. South Coast AQMD's Voucher Incentive Program (VIP)<sup>21</sup> provides incentives for smaller businesses with fleets of 10 or fewer vehicles that primarily operate within California. The Carl Moyer Program<sup>22</sup> is another incentive program for truck owners to obtain cleaner trucks.

South Coast AQMD staff is exploring a new system called Portable Emissions AcQuisition System (PEAQS) equipped with Automated License Plate Readers (ALPRs)<sup>23</sup> in collaboration with the California Air Resources Board (CARB). PEAQS measures emissions as vehicles pass by the sensors, while ALPRs are high-speed, computer-controlled camera systems that can capture license plate numbers that come into their view. ALPR data, when cross-referenced with the Department of Motor Vehicles (DMV) records, can provide more information about vehicles. South Coast AQMD staff is exploring the possibility of using this technology to identify older heavy-duty diesel trucks and notify truck owners who may qualify for incentive programs to replace their truck with newer cleaner models.

In support of AB 617, the legislature has budgeted funds for local air district incentives to support advanced technologies that reduce emissions in disadvantaged communities. CARB facilitates these incentives through the Community Air Protection Program (CAPP). CAPP incentives help owners of older high-polluting vehicles and equipment replace them with newer models with much lower emissions or zero emissions. The incentives may also be used for changes at local industrial facilities that reduce emissions of toxic or smog-forming pollutants, to build zero-emission charging stations, or to support local measures that air districts and communities identify through AB 617 Community Emissions Reduction Programs.

South Coast AQMD has funded about 360 mobile source projects (resulting in approximately \$78.1 million in grants) in 2018 – designated AB 617 communities with CAPP incentives. Examples of the type of projects funded include the replacement of heavy-duty trucks, off-road equipment, and locomotives, and zero-emission infrastructure (e.g., outlet for electric-powered truck refrigeration units). For more information on CAPP incentives, including the applications submitted and final project selection for the first two years of the program, please visit the following webpage at [www.aqmd.gov/cappincentives](http://www.aqmd.gov/cappincentives).

## Examples of Actions to Reduce Emissions or Exposure

To address community concerns about emissions from Trucks and Freeways in SELA the South Coast AQMD staff is seeking input from the CSC on goals and policies (or actions) for the SELA Community Emissions

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<sup>21</sup> South Coast Air Quality Management District, Voucher Incentive Program.  
<http://www.aqmd.gov/home/programs/business/business-detail?title=voucher-incentive-program&parent=vehicle-engine-upgrades>, Accessed July 6, 2020

<sup>22</sup> South Coast AQMD, Carl Moyer Program (Heavy-Duty Engines).  
<http://www.aqmd.gov/home/programs/business/business-detail?title=heavy-duty-engines&parent=vehicle-engine-upgrades>, Accessed July 6, 2020.

<sup>23</sup> California Air Resources Board, Improving On-road Vehicle Data: Automated License Plate Readers (ALPR) Portable Emission AcQuisition System (PEAQS), slide 35 through 42.  
<http://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/east-la/meeting-presentation-may26-2019.pdf>, Accessed July 6, 2020.

Reduction Plan (CERP). Figure 6 – Example of CERP Goal and Actions, provides an example of a goal and actions to address emissions from trucks and freeways. South Coast AQMD staff is interested in hearing innovative ideas from the CSC to reduce truck and freeways emissions through the SELA CERP.

**Figure 6 – Example of CERP Goal and Actions**

Goal	Potential Actions
<p><b>REDUCE EMISSIONS FROM HEAVY DUTY DIESEL TRUCKS</b></p>	<ul style="list-style-type: none"> <li>• Conduct air measurements near fuel stations and storage yards to identify potential hotspots from heavy-duty truck activity (e.g., idling)</li> </ul>
	<ul style="list-style-type: none"> <li>• Conduct focused enforcement for idling trucks in areas prioritized by the CSC</li> </ul>
	<ul style="list-style-type: none"> <li>• Target incentive funds for local small businesses and independent owner/operators (e.g., voucher incentive program)</li> </ul>
	<ul style="list-style-type: none"> <li>• Provide information about incentive programs to owners of older, polluting trucks that frequently travel through the community using ALPR, PEAQS, and DMV data</li> </ul>